String compactifications, W-algebras and brane symmetries

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Abstract

A string compactification on a special holonomy manifold has an associated W-algebra of symmetries. This correspondence between geometry and conformal field theory has spectacular consequences: for instance, mirror symmetry was originally discovered through the W-algebra associated to Calabi-Yau manifolds.
For compactifications with NS flux, the G-structure of the underlying manifold has non-zero torsion and the fate of the associated W-algebra is unclear. In this talk I will show how the presence of torsion corresponds to a deformation of the special holonomy W-algebra, and I will illustrate this for compactifications on manifolds with a G2-structure or an SU(3)-structure. In addition, I will discuss recent progress on incorporating branes into the picture, and how an enhanced algebra of symmetries emerges in a tensionless limit.
This talk is based on 2412.13904 as well as work in progress with Xenia de la Ossa and Enrico Marchetto; and on 2512.20590 with Leron Borsten and Hyungrok Kim.

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